

Seminar of the Work Group  
Nonlinear Partial Differential Equations  
SS 2021

**Speaker: Changzhen Sun**  
**July 9, 2021, 14:00 - 15:30**  
**Zoom Link: <https://kit-lecture.zoom.us/j/7143665630>**  
**Meeting ID: 714 366 5630**

Uniform regularity and low Mach number limit for the viscous fluids  
in a domain with boundaries

University of Paris-Saclay

**Abstract**

We will talk about the propagation of uniform (w.r.t the Mach number  $\varepsilon$ ) high order regularity and the incompressible limit for compressible Navier-Stokes equations in a domain with fixed or free boundaries. In the case of the fixed domain, we can establish the above result by assuming the initial data to be ill-prepared (in the sense that the acoustic part of the system is at of order one initially) while in the case of the domain with free boundaries, due to the difficulties arising from the regularity of the surface, we are forced to allow the data to be slightly well-prepared (in the sense that the acoustic part is at of order  $\sqrt{\varepsilon}$ ). The simultaneous appearance of the boundary layer and the fast oscillation effects is the main difficulty for the proof.

These are joint works with professors Nader Masmoudi and Frederic Rousset.